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MANAGING IN THE CONTEXT OF THE NEW ELECTRONIC MARKETPLACE

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Managing In The Context Of The New Electronic Marketplace

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Abstract

Electronic marketplaces (EMs) are virtual marketplaces where buyers and suppliers meet to exchange information about prices and product and service offerings, and to negotiate and carry out business transactions. They are at the centre of the current growth in Internet electronic commerce, both in business-to-business (B2B) and business-to-consumer (B2C) markets, although the value of B2B electronic commerce is proportionately five times B2C and is expected to exceed ten times its value by 2003.

In this paper, we trace the evolution of EMs, from their initial beginnings as computer-to-computer links between corporate trading partners, to their current forms as multi-vendor Web-based catalogs and ordering systems that service B2B customers. We also describe in detail B2B electronic marketplaces, including sell-side, buy-side, and intermediary-supported multi-vendor catalog systems that link customers and suppliers. We discuss the role of management in guiding firms through this difficult transition period, including choices that depend on the economics and the advantages and disadvantages of each form of electronic marketplace for both suppliers and customers.

Keywords: Electronic marketplace solutions, implementation choices, business-to-business e-commerce.

1. Introduction

An electronic marketplace (EM) is a virtual marketplace where buyers and suppliers meet to exchange information about prices and product and service offerings, and to negotiate and carry out business transactions. Electronic marketplaces are at the centre of the current growth in electronic commerce, and may involve business-to-consumer systems (B2C) or business-to-business (B2B) systems. These support activities such as ad hoc purchasing and auctions through the Web, while requisitioning from external suppliers under blanket contracts can be handled through inter-organizational information systems (IOS). The preponderance of Internet business is now B2B, estimated at five times the value of B2C, and predicted to grow to ten times its value by 2003 [10, 28]. Because of the relative importance of B2B, this discussion will focus on the managerial issues of dealing with B2B electronic marketplaces, where company participants may include buyers, suppliers, multi-firm consortia, or independent third parties.

In the B2B environment, electronic marketplaces have existed since the early 1970s, supported by IOS that link one or more firms to their customers or suppliers through private networks known as value-added networks or VANs. These make use of standard protocols such as EDI or EDIFACT to share information among participating companies through computer-to-computer exchange of electronic documents relating to purchasing, selling, shipping, receiving, inventory, financial and other activities. As such, they are commonly referred to as EDI systems [9, 25]. Distinguishing characteristics include the necessary investment in systems and organizational infrastructure to participate, and the volume of business required to justify this investment. They typically have little to offer in terms of end-user interaction and support. Because they are proprietary, complex, and costly, only a relatively few, large organizations undertook their installation, sometimes requiring their smaller trading partners to implement them as a prerequisite to doing business [15, 19, 21].

In the past few years, B2B system applications have been expanding rapidly, due to the availability of low cost Web interface designs and the ubiquity of the Internet as a common interconnection facility. End-user interfaces through the Web have made on-line catalogs and ordering systems easy to implement, linking end-users in customer companies to supplier

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companies through IOS, either over private networks or through public networks such as the Internet. This moves the ordering process to end users, alleviating structured workloads in purchasing and accounts payable departments and freeing them to handle more complex tasks. Interfacing these systems to internal information systems such as enterprise resource planning systems (ERP) makes it possible to handle a substantial fraction of transactions automatically, thus greatly increasing the speed of handling transactions, as well as reducing transaction processing costs. A number of strategic partnerships of business e-commerce solution developers with ERP vendors have been formed (e.g. Ariba/Grainger/J.D. Edwards, Commerce One/Peoplesoft) to take advantage of opportunities in this field.

The advent of Internet EDI has also widened its application to public networks, but at considerably lower cost. Advantages include flat rate pricing for information communication, cheap access, common mail standards, and public key encryption standards to ensure privacy of EDI transmissions. Non-proprietary solutions enable users to choose the level of service needed. For example, a VAN operating over the Internet can provide unbiased intermediary services that may be legally necessary, such as providing transaction time stamp verification to ensure non-repudiation of transaction events.

The success of the electronic marketplace depends on the net benefit that both buyers and suppliers perceive. It is clear that there have been gains to companies that use EMs for business-to-business transactions. For example, an industry study [1] showed a resulting 5% to 10% reduction in prices for goods and services through lower material and service costs, reduction of acquisition and order fulfilment cycle times of 50% to 70%, reduction of requisition processing costs of 70% per order, and improved inventory management practices. Another example is Cisco's Web site (Cisco manufactures, sells, and services networking equipment). This site currently handles over 80% of orders the company receives, resulting in a $500m bottom line impact, relative to equivalent telephone sales and service operations, on $9.5b revenue in their most recent year (as of July 1999) [26]. Some caution is advised in interpreting these examples, since the impact of digital markets on market efficiency (price elasticity, menu cost/price discrimination, and price dispersion) show partially contradictory results [24]. However, the implementation of such systems is attractive to firms that are willing to risk the necessary

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investment and to deal with the changes in technology, organization, and operational practices that are needed to implement them successfully.

With an annual growth rate of 175% for Internet-based e-commerce, businesses are moving rapidly to adopt these new ways of doing business. However, this represents major management challenges to supplier and customer firms alike, since it involves reengineering internal organizations and systems, and adapting to different ways of interacting with suppliers and customers. Adding to the complexity of the transition to e-commerce solutions is the need to support previously existing and parallel marketing and supply channels. In this paper, we will focus on some of the economic issues that face firms when selecting the architectural, technological, organizational, and management approaches to support business endeavors in the electronic marketplace.

2. Literature Review

Published works on the economics of electronic markets have focused on transaction cost theory [31]. This theory examines the economic efficiency of markets by considering different coordination mechanisms and the properties of the market, such as specificity and uncertainty. The two main methods for coordinating the flow of goods and services are markets and hierarchies [16]. Markets coordinate the flow through supply and demand forces, while hierarchies (with pre-determined customers and suppliers, such as manufacturing assembly plants and their component suppliers) rely on managerial decisions to coordinate flows. "Mixed mode" network structures, an intermediate form of marketplace, are a situation-dependent form existing in many business relationships, which blends hierarchical and market structures in a coordinated manner [13, 22, 29]. The advent of the Internet has led to an evolution in the types of IOS that can support these market structures, with the added benefit of market coordination, reductions in coordination/transaction costs, and lessening product and service (P/S) specificity. A current growth area is in the development of IOS to support structured business relationships through intermediaries (for a limited summary of existing systems see [18] and [23]).

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Characteristics of electronic marketplaces which are relevant to economic analyses include [4] : 1) EM systems can reduce costs of acquiring and communicating information about prices and products, 2) benefits to EM participants increase as more organizations join the marketplace, 3) EMs can impose significant switching costs on participants, 4) EMs typically require large capital investments and offer substantial economies of scale and scope, and 5) participants in EMs face substantial uncertainties in the benefits to be achieved by joining. From the viewpoint of transaction cost economics, information technology helps to reduce transaction costs, risks, and coordination costs in electronic marketplaces [8]. An important effect is the recent shift of customer organizations towards "the middle", to more cooperative, integrated inter-organizational relationships with fewer suppliers. Evidence of this is seen in the growth of outsourcing and more tightly coupled business-customer relationships.

Figure 1 is a depiction of the B2B transaction process, where sellers interact with buyers through their marketing and sales distribution functions, with the support of internal processes such as manufacturing, logistics, and accounting, linked through internal information technology. Buyers interface with sellers through the procurement function, linked to supporting internal processes such as receiving, accounts payable, and operations, through internal information systems. IOS may also link to the internal systems of seller and buyer, and support the interfaces used by both companies to communicate. Intermediary functions may support a multiplicity of activities, including brokerage, payments, logistics, legal, consulting, or may support inter-company communications through third party IOS and related systems.

In a model of search costs in a differentiated market, with multiple suppliers and multiple buyers, it has been shown [3] that suppliers as a group have no incentive to introduce their own EMs, and that suppliers are always worse off with EMs that reduce buyer search costs. If there is more concentration of buyers than suppliers, then suppliers may be better off to develop their own EMs. Suppliers may also want to control the type of EM, so that P/S descriptive information is emphasized over price, making it difficult for buyers to compare prices. Another supplier strategy is to use information provided through the EM to help differentiate P/S, even those normally regarded as commodities.
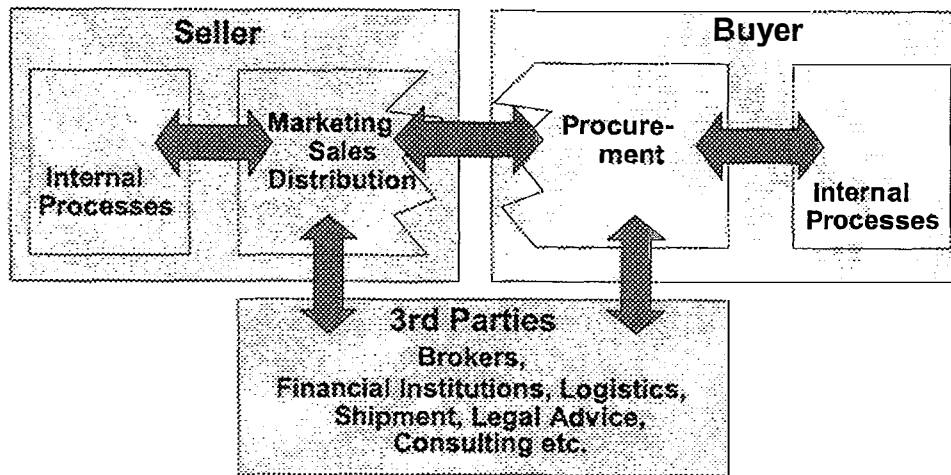
Figure 1. *B2B Transactions and Participants* ([30], p. 156)

In a multiple supplier and single buyer hierarchy, coordination costs (setting up the supplier relationship, search costs, and transaction costs, etc.), may be reduced through the use of information technology. Incentives (non-contractible characteristics such as innovation, adoption of new technology, quality, information exchange, trust, flexibility, responsiveness, etc.) help to promote a tendency of businesses to move to fewer suppliers. This counteracts the tendency of coordination cost reduction through information technology that increases the number of suppliers [5].

An important consideration affecting the amount of investment and effort in setting up business process infrastructures to handle e-commerce is the complexity of the business transactions to be handled. Complexity is determined by factors such as the number of sub-processes and organizational units that are involved, as well as their possible interactions, interdependencies and relationships with the process environment [14]. Since the type of goods or services involved in a transaction affects the complexity of handling the transaction, it is useful to classify transactions according to the objects being exchanged, as in Table 1[12]. From the table, acquiring MRO supplies and services (Type 2) is the least complex type of transaction. Acquiring capital goods and making other types of ad hoc purchases (Type 3) tend to be the most complex because of their unique characteristics and infrequent occurrence.

> 1. Raw material and production goods and services (large quantities, high frequencies, unique specifications, often just-in-time delivery)
> 2. Maintenance, repair, and operating supplies and services – MRO (low unit cost, low volume, off-the-shelf, relatively high frequency)
> 3. Capital goods, and ad hoc procurement for functions such as new product development (often outside the normal procurement process because of convenience, speed, and unique specifications).

Table 1. *Transaction Classification According to Type of Object Exchanged*

Different forms of transaction support infrastructure may be chosen, such as EDI systems or online ordering systems. The circumstances of each subsequent situation or transaction determine whether the chosen infrastructure can be used (standard situation) or whether an exceptional situation prohibits the use of the system at justifiable costs. Exceptional instances then need to be handled manually either totally or in part. The cost of handling standard or exceptional situations is determined by the type of infrastructure in place (standard processing costs can be very low if processes are fully automated, but at the same time it might be difficult/expensive to handle exceptions). Managers need to decide which type of system (infrastructure) is suited best to handle all the instances that might occur throughout the life time of the system (a trade-off between automation and flexibility). All other things such as process strucure and uncertainty being equal, automation will be more feasible for low complexity processes than for complex processes [11].

3. Electronic Marketplace Solutions

Within the spectrum of electronic market structures, ranging from hierarchical to pure market, there are three major forms of IOS that support inter-organizational transactions. These are sell-side (initiated by a supplier, with multiple buyers), buy-side (initiated by a buyer, with multiple suppliers) and third party intermediary (operated by an intermediary for multiple buyers and multiple suppliers). An intermediary in this context is a company that provides a service that promotes trade between buyers and suppliers in trade in some way, including [2]: a) matching buyers and sellers, b) ensuring trust among participants by maintaining a neutral position, c)

facilitating market operations by supporting certain transaction phases, and d) aggregating buyer demand and seller information. The following describes the three IOS forms.

3.1 Sell-side Solutions

A sell-side solution is a single supplier, multiple buyer market hierarchy which has been shown to become a strategic necessity when the network becomes large enough [7], creating a high incentive for buyers to join. Sell-side solutions are initiated by major suppliers and distributors to support their selling processes. In addition to online catalogs these systems usually feature online ordering, and provide for customized and secure views of the data, based on business rules from contract agreements with individual firms. In some cases support for individual buying processes, such as approval routing and reporting, is also provided. In setting up a supply-side system, the supplier controls its content and administrative features, such as compliance with corporate purchasing rules, etc. Examples of sell-side solutions are the online Web sites of computer manufacturer Dell (www.dell.com), wholesale distributor W.W. Grainger (www.grainger.com , www.orderzone.com), and Works.com (www.works.com) that these companies use to interface with business customers.

The particular implementations displayed on the Web do not link directly to internal customer information systems, but this is just one interface. These systems can also link to company intranet systems. Most current sell-side systems handle MRO transactions, but there is little doubt that they will evolve towards handling more complex transaction types in the future.

A drawback of sell-side systems is that buying organizations may have to integrate their systems with multiple different solutions if they deal with multiple suppliers. However, buyers benefit from enhanced customer value through cost/time savings and continuous availability, compared to traditional solutions. Suppliers work to increase the reach of their solutions and provide sophisticated and easy-to-use systems. They also try to lock-in customers with additional functions that complement transaction support, providing the basis for comprehensive one-stop shopping sites. Intermediaries may participate in the solution by providing additional services to the controlling supplier organization. This includes EFT transactions by banks, and other

functions that can be provided by e-commerce specialist firms, such as providing expertise in the design, development, and/or operations of the supply-side system.

3.2 Buy-side Solutions

Buy-side solutions are often set up by a major member of the buying community to support its purchasing processes. In these systems the buying organization is in control of catalog content, data format, and backend system functionality. Suppliers wanting to participate in multiple buy-side solutions may have to deliver their data in multiple different formats. Examples of such systems are intranet-based procurement systems that have been initiated by Chevron Corp. in California, and the County of Los Angeles [23]. These examples are intermediate forms of electronic marketplaces, with some elements of marketplace structures and some of the more permanent hierarchical arrangements between supplier and customer. Large companies may host e-commerce solutions internally, but an alternative is to work through third party intermediary solutions, using Internet browsers to access procurement functionality. Some systems also support a broader functionality that handles less structured procurement. For example, General Electric's Trading Process Network® supports production tendering and purchasing.

Benefits of such systems to buyers include streamlined purchasing operations, including sizable fractions of transactions that can be fully automated. This results in time and cost savings, and freeing purchasing and accounts payable personnel from clerical work so they can take on more strategic tasks. As information quality is improved, maverick buying (end-user purchasing from non-standard suppliers) can be reduced, leading to more favorable contracts with fewer suppliers. Suppliers benefit from long-term relationships, and possibly sole sourcing agreements. In some cases these systems include automated transaction and data uploading procedures. Buy-side solutions can only be successful if they attract suppliers with the appropriate coverage and volume. This is possible if the supplier's costs, including additional infrastructure, preparing and uploading catalog data, linking through IOS to the supplier's internal system, etc., do not outweigh the benefits of participation.

Supplier participation in such a system will most likely depend on the way it can be represented in the catalog system. The initiating buyer organization decides on the scope of the catalog, and which suppliers and products to include. It chooses whether to use an intermediary to design, develop, and manage the system. Similarly, intermediaries must weigh the cost and benefits of participation.

3.3 Intermediary Solutions

Third-party intermediaries may also initiate IT systems to support electronic transactions. These solutions usually provide support for both buying and selling processes and can have either marketplace characteristics or more permanent hierarchical-type arrangements as network governance structures. Intermediaries involved in supporting electronic marketplaces include, but are not limited to: auctions, electronic catalogs, distributors, retailers, brokers, financial institutions such as banks, etc. Auxiliary value added functions may include industry news, online forums, etc. The intermediary typically controls catalog content, aggregates supplier input, and provides additional functionality and standardized data access to buyers. Some systems, such as Marketsite®, AribaNet®, and Works.com® are used for horizontal markets (supporting a specific function such as MRO purchasing). Others, such as Metalsite®, Chemdex®, and VerticalNet®, support vertical markets (specific industries).

Intermediaries face a difficult balancing task, as they have to set up solutions that satisfy their suppliers and buyers simultaneously. Before any party agrees to participate in the intermediary's marketplace, its total costs should not outweigh the overall benefits it will receive from the arrangement. The intermediary on the other hand needs to choose a particular business model and to determine which suppliers and buyers to recruit as participants.

Intermediaries, to be effective in the face of the challenge of e-commerce, must compete with other techniques that suppliers and customers use to meet their needs. This is probably the business classification that has felt the most impact from electronic commerce. Disintermediation is a distinct threat as manufacturers compete directly in the marketplace in order to price more

competitively and differentiate their products (e.g. Dell, which deals directly with PC customers instead of using a distribution network).

New forms of electronic intermediaries continue to appear that provide traditional functions in innovative ways, in the form of value added functions, to the buyers and suppliers they service. Intermediary solutions provide several benefits to both suppliers and buyers. First, they eliminate the need for suppliers to link directly to buyers or to link through the more costly value added networks (VANs) as they do in EDI solutions. The savings from implementing only one interface to the intermediary instead of multiple interfaces to many suppliers or customers may be quite substantial.

Second, suppliers may deliver content in one standard format, while buyers access one integrated solution. One of the parties, or both, pay service charges to the intermediary that may depend upon transaction volume and setup costs. How the costs are split between suppliers and customers depends on how market power is distributed among them. Third, they provide customer flexibility, since intermediary solutions typically support more ad hoc transactions and customers are likely to use the system to search for desired products and services, since they are not limited contractually to deal with specific suppliers. This creates pressure on suppliers to ensure that they do not compete just on price, but on other product or service characteristics such as quality, delivery, customization features, etc. Such marketplace solutions are more practical than supply-side or buy-side systems for small to medium enterprises, which do not have a high volume of trade with any particular customer or supplier.

4. Management Considerations

Management must make difficult decisions in the face of the rapid changes that are being forced upon companies by electronic marketplaces. Although some market characteristics haven't changed (e.g. the importance of brand recognition, and trust), others have. For example information technology can be used in innovative ways to achieve competitive advantage, combat potential loss of market share, re-define products or services through mass

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customization, differentiate by means of Web service support, or enter new markets by joining electronic marketplaces. We consider a few of the more important issues below.

4.1 Small-to-Medium Enterprises

Handling B2B transactions through Web e-commerce solutions is one way for smaller firms (SMEs) to make the transition to an IOS, but without totally automated transaction management. Another more recently available solution is hosted procurement solutions, where the SME does not have to install any software, but can just use a browser to access procurement functionality. Ariba, Commerce One and Oracle have all announced that they will be offering hosted applications.

Supply-side solutions with Web access can also be used as parallel channels for larger businesses, to deal with small suppliers or customers that do not have the resources to commit to full IOS capabilities. This allows end-users in customer firms to handle the ordering process without human assistance, thus increasing customer satisfaction and reducing transaction handling costs, error rates, and turnaround times.

4.2 Choice of Marketplace Solution

Table 2 is a summary and comparison of the characteristics of the three marketplace solutions identified above. Generally, sell-side and buy-side solutions are originated by supplier and customer firms respectively, but only if they have significant market power. Counterpart buyer and supplier participants are selected because they are able to meet the P/S needs of the corresponding supplier and customer firms. Intermediary solutions tend to be closer to the marketplace model, where purchases are more likely to be ad hoc and where suppliers and customers of all sizes may participate.

Characteristic	Sell-Side	Buy-Side	Intermediary
Structure	Hierarchy or mixed mode	Hierarchy or mixed mode	Marketplace
Organizer	Major supplier	Major buyer	Intermediary
Operator	Supplier	Buyer	Intermediary
Risk Taker and Major Investor	Supplier	Buyer	Intermediary and/or partner(s)
Importance of Internal System Links	High	High	Low-Medium
Infrastructure Support	VAN/EDI or Web/IOS	VAN/EDI or Web/IOS	Web/Internet EDI
User Interface	Intranet/Web	Intranet/Web	Internet/Web
Implications to Partners	Contract agreements, volume discounts, automated transactions	Contract agreements, volume discounts, automated transactions	Setup cost, transaction charges
Disadvantages	Buyers need non-standard interface to each supplier	Suppliers need non-standard interface to each buyer	Suppliers/buyers dependent upon intermediary to provide market customers/suppliers
Examples	Grainger, Cisco	Wal-Mart, Chevron	Commerce One's MarketSite, Ariba.net (horizontal markets), MetalSite, Chemdex, VerticalNet (vertical markets)

Table 2. *Summary of Electronic Marketplace Characteristics*

4.3 Parallel Operations

In considering whether to move entirely to an on-line basis rather than combining older physical operations with Web presence, some companies (e.g. Dell, Cisco, Charles Schwab) have moved the majority of their operations on-line. Companies most likely to move entirely to the Internet are traditional middlemen such as travel and insurance agencies, which can broker information more widely, cheaper, and more quickly over the Internet. Discount surplus or seasonal goods, and specialty shops with costly or hard-to-find goods find they can reach very large markets more cheaply through the Web. Although eliminating an existing physical

presence will reduce costly overheads, going on-line may also eliminate the substantial fraction of the potential business market that does not have ready access to nor use the Internet regularly for procurement. It has also been found that maintaining existing channels as well as going on-line can provide complementary solutions. For example, in the consumer world, Sears has found that people who buy through its Web site actually spend 27% more in Sears retail stores [27].

4.4 Implementation Choices and Outsourcing

A major decision that any firm must make, when considering the adoption of an e-commerce solution, is to evaluate the impact of this innovation on the firm. If a choice is made to implement some form of e-commerce, it may be necessary to do a substantial amount of reengineering of the firm's business processes [17]. This may be very risky, especially if the new solution is to operate in parallel with existing business channels. Pant and Hsu [20] suggest a framework for considering business on the Web, from the internal IT organization's point of view. This includes analyzing strategic and competitive advantages linked to company business strategy, and pursuing opportunities that support this strategy. Under the direction of senior management and users, the entrepreneurial approach (user innovations) is encouraged, resulting in simultaneous bottom-up development and top down analysis. However, this suggested approach does not address the uncertainties that may be involved with e-commerce technology, and the need to avoid making large commitments of existing technical and operations staff and facilities to new technology and business processes with which the company is unfamiliar.

To evaluate the risk involved in adopting an innovation such as e-commerce, Christensen's model [6] can be very helpful. For a company considering adopting an e-commerce solution, this model evaluates the innovation in terms of a number of its attributes, helping to classify it as either "sustaining" or "disruptive" to the firm. Table 3 shows Christensen's model applied to an analysis of e-commerce solutions. Note that each factor really has a spectrum of possibilities, and the classifications given in the table lie at the two extremes of the spectrum. By analyzing a particular proposal according to these considerations, a company can make a reasoned judgement on how to proceed towards implementation. If a proposed e-commerce solution is not categorized as disruptive, then it can be implemented within the firm's

existing operations, linking them to on-line customers or suppliers. However, if several of the factors in the proposed solution are classified as "disruptive", careful consideration should be given to mitigating potential disruptions to the company when it implements the innovation, by : a) spinning off a separate organization to implement it, b) outsourcing the proposed system, c) taking over an organization with the expertise to handle it, or d) forming an alliance with another company with technical competence and experience in the field.

Factor in E-commerce Proposal	Classification	
	Sustaining	Disruptive
Products/Services Supported	Similar to current	Totally revised or new
E-commerce Technology	Familiar to the organization	Relatively unfamiliar
Target Customer Population	No change	Larger and/or different
Geographical Market	No change	Highly extended from current
Business Functions Supported	No change, but with new supporting technologies	Substantially different functions
Business Processes Involved	No change	Revised, simplified, and/or restructured
Level of Interaction with Customers, Suppliers	Passive, e.g. through Web page displays only	Dynamic and extensive
Level of E-commerce Supported	Product/service information only	Product/service information, sales, transactions, after-sales service support
Uncertainty	Low in all areas	Extensive, in one or more of market, technology, demand, products, or services
Investment	Moderate	High
Risk	Low	High
IOS Development Required	Extension of existing system	New system, both internal and external

Table 3. *Sustaining Versus Disruptive Corporate E-commerce Innovations*

5. Discussion and Recommendations

In the context of emerging technologies, and particularly in electronic markets, managers must re-think the way they do business today. E-commerce affects all aspects of the organization, including:

a) *Objectives (cost driven vs. customer focused)* The best choice is likely to be affected by the firm's market power. A firm with little market power must concentrate more on the open marketplace and expend more effort on establishing and maintaining high quality customer relationships, while a firm with market power should concentrate on implementations that reduce transaction costs through more tightly coupled hierarchical relationships.

b) *Relationships (long term vs. short term or ad hoc)* Hierarchical structures and IOS, that promote easy and direct communications between customer and supplier, are likely to involve a substantial degree of automation. They also promote longer term relationships because of the substantial up front investments which increase switching costs. Short term or ad hoc relationships are typical of electronic marketplaces. Here, continuing and open competition encourages suppliers to differentiate their P/S on non-price characteristics.

c) *Business processes and pricing models (fixed vs. dynamic).* In hierarchical markets, competition will be stiffer, resulting in heavy volume discounting and longer term contracts. This encourages more investment in IOS that link the business partners in closer relationships through joint business processes, thus raising switching costs. In an ad hoc marketplace where volumes are low, pricing will be dynamic and variable. In a marketplace, firms can expect to pay spot prices, while long term contracts in hierarchical arrangements tend to insulate firms from price and availability fluctuations.

d) *Business scope (make vs. buy).* Outsourcing of e-commerce transaction and support services is becoming more common, especially for firms which lack the necessary technical expertise. But impacts on internal organization and on existing operations must also be considered. In general, if an evaluation of a proposed e-commerce solution shows that

implementing it will be disruptive in the company's environment, then some variation of outsourcing should be considered, to reduce the potential risk of failure.

Finally, a company that is searching for e-commerce solutions should be flexible regarding systems and processes, and focus on process efficiency, openness and connectivity (modular systems, open standards, allowing for ad-hoc linkages). Because of the importance of connectivity, the company should also eliminate islands of automation that are incompatible with other internal systems and with those of major trading partners, with respect to both data and communications.

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